CLAIMS

What is claimed is:

1. A composition comprising an aqueous dispersion of an electrically conductive organic polymer and a plurality of nanoparticles.

2. A composition according to claim 1, wherein said electrically conductive organic polymer is selected from polyaniline with poly(2-acrylamido-2-methyl-1-propanesulfonic acid) as the counterion (PAni/PAAMPSA) and poly(ethylenedioxythiophene) with poly(styrenesulfonic acid) as the counter ion (PEDT/PSS).

3. A composition according to claim 1, wherein said nanoparticles are inorganic nanoparticles.

4. A composition according to claim 3, wherein said inorganic nanoparticles are selected from silica, alumina, and electrically conductive metal oxides.

5. A composition according to claim 1, wherein said nanoparticles are organic nanoparticles.

6. A composition according to claim 5, wherein said organic nanoparticles are selected from polyacrylates, carbon nanotubes, and perfluoroethylene sulfonates.

7. A composition according to claim 1, wherein said nanoparticles have a particle size less than about 500 nm.

8. A composition according to claim 1, wherein said nanoparticles have a particle size less than about 250 nm.

9. A composition according to claim 1, wherein said nanoparticles have a particle size less than about 50 nm.

10. A composition according to claim 4, wherein the weight ratio of silica:electrically conductive polymer is about 4:1.

11. A composition according to claim 4, wherein the weight ratio of electrically conductive oxides:electrically conductive polymer is about 1.5:1.

12. A high resistance buffer layer comprising an electrically conductive polymer and a plurality of nanoparticles dispersed therein.

13. A high resistance buffer layer according to claim 12, wherein said electrically conductive polymer is selected from PAni/PAAMPSA and PEDT/PSS.

14. A high resistance buffer layer according to claim 12, wherein said nanoparticles are inorganic nanoparticles.

15. A high resistance buffer layer according to claim 12, wherein said inorganic nanoparticles are selected from silica, alumina, or electrically conductive metal oxides.

16. A high resistance buffer layer according to claim 12, wherein said nanoparticles are organic nanoparticles.

17. A high resistance buffer layer according to claim 12, wherein said organic nanoparticles are selected from polyacrylates, carbon nanotubes, and perfluoroethylene sulfonates

18. A high resistance buffer layer according to claim 12, wherein said layer has a conductivity of less than about 1 x 10^{-3} S/cm.

19. A high resistance buffer layer according to claim 12, wherein said layer has a conductivity of less than about 1 x 10^{-5} S/cm.

20. An organic light emitting diode (OLED) comprising a high resistance buffer layer comprising an electrically conductive polymer and a plurality of nanoparticles dispersed therein.

21. An OLED according to claim 20, wherein said electrically conductive polymer is selected from PAni/PAAMPSA or PEDT/PSS.

22. An OLED according to claim 20, wherein said nanoparticles are inorganic nanoparticles.

23. An OLED according to claim 20, wherein said inorganic nanoparticles are selected from silica, alumina, or electrically conductive metal oxides.

24. An OLED according to claim 20, wherein said nanoparticles are organic nanoparticles.

25. An OLED according to claim 20, wherein said organic nanoparticles are selected from polyacrylates, carbon nanotubes, and perfluoroethylene sulfonates.

26. An OLED according to claim 20, wherein said buffer layer has a conductivity less than about 1 x 10^{-3} S/cm.

27. A thin film field effect transistor electrode, comprising an electrically conductive polymer and a plurality of nanoparticles dispersed therein.

28. A thin film field effect transistor electrode according to claim 36, wherein said electrically conductive polymer is selected from PAni/PAAMPSA or PEDT/PSS.

29. A thin film field effect transistor electrode according to claim 27, wherein said nanoparticles are inorganic nanoparticles.

30. A thin film field effect transistor electrode according to claim 27, wherein said inorganic particles are metallic nanoparticles.

31. A thin film field effect transistor electrode according to claim 27, wherein said metallic nanoparticles are molybdenum nanoparticles.

32. A thin film field effect transistor electrode according to claim 27, wherein said nanoparticles are organic nanoparticles.

33. A thin film field effect transistor electrode according to claim 27, wherein said organic nanoparticles are carbon nanotubes.

34. A thin film field effect transistor comprising an electrode according to claim 27.

35. A thin film field effect transistor according to claim 34, wherein said thin film field effect transistor has a conductivity greater than about 10 S/cm.

36. A method for reducing conductivity of an electrically conductive organic polymer film cast from aqueous dispersion onto a substrate to a value less than about 1×10^{-3} S/cm, comprising adding a plurality of nanoparticles to said aqueous solution.

37. A method for producing buffer layers having increased thickness, comprising adding a plurality of nanoparticles to an aqueous dispersion of a conductive organic polymer, and casting a buffer layer from said aqueous dispersion onto a substrate.

38. A method for increasing conductivity of thin film field effect transistor electrodes cast from aqueous dispersion onto a substrate to a value greater than about 10^{-3} S/cm, comprising adding a plurality of nanoparticles to said aqueous solution.

39. A method according to claim 38, wherein said nanoparticles are selected from metal nanoparticles and carbon nanotubes.